

XLI.—Notes on the Infusorial Parasites of the Tasmanian White Ant. By W. SAVILLE KENT, F.L.S., F.Z.S., Superintendent and Inspector of Fisheries, Tasmania*.

So long since as the year 1856 M. C. Lespés, in a memoir devoted to the organization of the European white ant (*Termes lucifugus*), recorded the fact that the contents of the intestine of this insect are represented by a brown pulp consisting chiefly of a living agglomeration of Infusoria. No specific description of these Infusoria has been published up to the present date, and it is only so recently as the year 1881 that a detailed account, with illustrations, of the analogous parasites of the American white ant (*Termes flavipes*) has been contributed by Dr. Joseph Leidy to the 'Proceedings of the Academy of Natural Sciences of Philadelphia.' Through the kind courtesy of Dr. Leidy I was enabled to include reprints of his drawings of these parasitic animalcules in my monograph of the Infusoria, then in course of publication, and subsequently received from him, while residing in London, a supply of the white ant with its accompanying parasites for personal examination.

It was with much interest that I discovered, soon after my arrival in Tasmania, that a species of white ant (specific name at present undetermined) abounds in this colony, feeding, after the manner of the North-American type, upon decaying timber, and having its intestine similarly laden with parasitic Infusoria. On making a close examination of these Infusoria I ascertained furthermore that they agreed with the American types in being referable to no less than three distinct varieties, two of which may be included in the generic groups instituted for the American species by Dr. Leidy, while the third form is entirely distinct. As species none of the series is precisely identical with any that have hitherto been described, and they have consequently to be recorded as new to science.

The largest and most abundantly developed form to which I will draw attention on this occasion is referable to Dr. Leidy's genus *Trichonympha*. It is an elongate or pyriform animalcule, having normally a smooth, somewhat inflated, posterior region, and an acuminate-pointed, highly flexible, anterior portion, which is more or less distinctly striated in a longitudinal direction. From Dr. Leidy's species *Trichonympha agilis* it differs most distinctly in the relative shortness

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of the hair-like cilia which clothe the entire surface of the body. In the last-named species a portion of these cilia are as long as or longer than the body, and exhibit under certain conditions a remarkable plume-like aspect. In the Tasmanian species, which, by way of compliment to the talented discoverer of the genus, I propose to distinguish by the title of *Trichonympha Leidyi*, the length of the cilia but little exceeds that of many of the Opalinidæ and other previously known endoparasitic Infusoria. It is furthermore not so easy to recognize in the present species that the cilia, with respect to their length, form three or four more or less distinct series, as obtains in the American variety; for while those that clothe the equatorial region of the body are somewhat the longer, the entire series merge into one another by almost imperceptible gradations. In this respect the species here introduced may be said to resemble an immature stage of the American type. The great flexibility of the anterior portion of the body is a feature common to the American and Tasmanian species, both exhibiting in a like manner a tendency to roll this region upon itself in the form of a helix.

An important point that was left undetermined by Dr. Leidy respecting the structure of *Trichonympha* relates to the precise position of the oral aperture. The bodies of the animalcules are almost invariably filled with fragments of the woody débris devoured by their hosts the white ants, which shows that their sustenance is taken into their body in a solid state, and is not simply absorbed in the fluid form, as occurs with the group of the Opalinidæ. A prolonged observation of living examples of the American species remitted me by Dr. Leidy, and likewise of the Tasmanian type here introduced, has resulted in my determining that a distinct oral aperture is developed upon one side of the body at a short distance only from the apical extremity. This orifice takes the form of a transverse slit, and is followed by a narrow œsophageal track, which opens into the capacious digestive cavity that occupies one half or two thirds of the posterior region of the body. The plan recommended by Dr. Leidy for observing the vital phenomena of these animalcules is to empty out the intestine of the white ant containing them into a little white of egg. I also have found this material favourable for their observation, but have gained an additional insight into their life-history by employing in a like manner thinly diluted milk. In this medium they not only live for a considerable time, but meet with abundant nutriment, their pharynx and digestive cavity being frequently found densely

packed with its component corpuscles after their immersion in this fluid for a short interval.

As with the American species, *Trichonympha Leidyi* is represented in its earlier and immature conditions by a host of polymorphic forms that differ greatly in aspect from the adults. The youngest observed are of an ovate contour, and clothed throughout with cilia of even length. These young individuals gradually increase in length until their long diameter may equal or even exceed four or five times their greatest breadth, the cilia in the more advanced phases being longest posteriorly, while the surface may be obliquely furrowed in opposite directions. It is in connexion with this transitory condition that I have observed the phenomena of propagation not hitherto recorded. This is effected by a process of transverse fission, division taking place towards the anterior region of the body along two intersecting furrows. The anterior of the two separated moieties assumes a pyriform outline, and grows speedily to the parent shape, while the posterior one retains its primitive attenuate fusiform contour, and may continue to multiply by fission.

When placed in diluted milk the animalcules of both the American and Tasmanian species of *Trichonympha* have been observed by me to assume a fixed condition that has not hitherto been described. An attachment to the surface of organic substances or other convenient fulcra is then accomplished through the medium of the long fascicle of hair-like cilia that are produced from their posterior extremity. These cilia, intersecting one another at a short distance from the body, form a sort of hollow cone, the expanded base of which grasps the selected fulcrum of support after the manner of an acetabulum. This habit of, as it were, anchoring themselves by their long caudal cilia was observed in both the adult and immature animalcules. No trace of the structure common to all higher Infusoria known as the contractile vesicle has been detected in connexion with *Trichonympha agilis*, and in the species now introduced it is, so far as I have been able to ascertain, as conspicuously absent. In this absence of a contractile vesicle *Trichonympha* assimilates itself to many Opalinidæ. While commenting upon the apparent position of *Trichonympha*, with relation to other Infusorial forms ('Manual of Infusoria,' vol. ii. p. 553), it was suggested by me that, with respect to the great length of its cilia and characteristic movements, it to some extent resembled the multiflagellate genus *Hexamita*. Though the more abundant evidence since adduced has sufficed to demonstrate that it belongs essentially to the Holotrichous

Ciliata, the great length of the cilia, the manner in which they are employed, and the habit the animalcules exhibit of anchoring themselves to foreign substances by their long posterior cilia, is suggestive of the remote derivation of these white ant parasites from a flagelliferous type allied to *Hexamita*.

Of the two remaining Infusoria found by me in the Tasmanian white ant the one is apparently referable to Dr. Leidy's genus *Pyrsonympha*, while the other belongs to Stein's multi-flagellate genus *Lophomonas*, so far recorded as a parasite only of the Orthopterous insects *Blatta* and *Grylotalpa*. Several important points in their organization not having yet been clearly ascertained, descriptive details of these two new forms are reserved for a future communication.

XLII.—*On a Variety of the Freshwater Sponge Meyenia fluviatilis*. By H. J. CARTER, F.R.S. &c.

ON the 17th of December, 1883, I received from Mr. B. W. Thomas, F.R.M.S., of Chicago, a mounted preparation, with specimen in the natural state, of a variety of *Meyenia fluviatilis*, which he had found in the Calumet river near the lake of this name, in the township of Calumet, South Chicago, suggesting, if it were new and undescribed, that it might be designated "*calumetica*." At this time I did not consider the differences were sufficient to constitute a variety that should be named, so, in reply, wrote to Mr. Thomas to this effect.

Subsequently, however, I had occasion to examine some preparations of *Meyenia fluviatilis* from various localities near London, which my friend Mr. J. G. Waller had kindly sent me, and amongst them noticed one labelled "Ditchley's" which not only differed from the rest, but presented the same varietal peculiarities as the Calumet specimen; hence I began to attach more importance to Mr. Thomas's suggestion than I had hitherto done. Meanwhile I received another specimen labelled "Ditchley's—England," from Mr. H. Mills, of Buffalo, N. Y., in which there were a number of immature statoblasts together with the spiculation of the Calumet variety; and having, in reply, stated that it was the same sponge as that which Mr. Thomas had proposed to designate "*calumetica*," I learned from Mr. Thomas afterwards that Mr. Mills had sent my letter on to him; that he was glad that I recog-